Naval Education and Training Command

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Nonresident Training Course (NRTC)

Electronics Technician

Volume 6—Digital Data Systems

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

Although the words “he,” “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this text.

ELECTRONICS TECHNICIAN—VOLUME 6

DIGITAL DATA SYSTEMS

NAVEDTRA 82416-A

Prepared by the Naval Education and Training Professional
Development and Technology Center (NETPDTC), Pensacola, Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program. You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

ERRATA: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the associated text or assignments in any other way.

TEXTBOOK ASSIGNMENTS: The text for this course is *Electronics Technician—Volume 6, Digital Data Systems*, NAVEDTRA 12416-A. The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course. Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided at the beginning of each chapter or topic in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS: After studying the associated text, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the text. You may refer freely to the text and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course. Failure to follow these rules can result in suspension from the course and disciplinary action.

ANSWER SHEETS: You must use answer sheets designed for this course (NETPMSA Form 1430/5, Stock Ordering Number 0502-LP-216-0100). Use the answer sheets provided by Educational Services Officer (ESO), or you may reproduce the one in the back of this course booklet.

SUBMITTING COMPLETED ANSWER SHEETS: As a minimum, you should complete at least one assignment per month. Failure to meet this requirement could result in disenrollment from the course. As you complete each assignment, submit the completed answer sheet to your ESO for grading. You may submit more than one answer sheet at a time.

GRADING: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, your ESO will list the questions you answered incorrectly and give you an answer sheet marked "RESUBMIT." You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

COURSE COMPLETION: After you have submitted all the answer sheets and have earned at least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry in your service record.

NAVAL RESERVE RETIREMENT CREDIT: If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is divided into two units evaluated at 21 points.

Unit 1: 12 points upon satisfactory completion of Assignments 1 through 8.

Unit 2: 9 points upon satisfactory completion of Assignments 9 through 14.

(Refer to BUPERSINST 1001.39 for more information about retirement points.)

STUDENT QUESTIONS: If you have questions concerning the administration of this course, consult your ESO. If you have questions on course content, you may contact NETPDTC at:

DSN: 922-1546
Commercial: (904) 452-1546
FAX: 922-1819
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COURSE OBJECTIVES: In completing this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following broad topics: fundamentals and operations of computers, computer configurations and hardware, computer operator controls and controlling units, computer components and circuits, central processing units and buses, computer memories, input/output (I/O) and interfacing, computer instructions and man/machine interfaces, magnetic tape storage, magnetic disk storage, CD-ROM storage, printers, data conversion devices, and switchboards.

Naval courses may include several types of questions--multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material. upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses useall of the types of questions available. You can readily identify the type of each question, and the action required, by reviewing of the samples given below.

MULTIPLE-CHOICE QUESTIONS

Each question contains several alternative answers, one of which is the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

s-l. The first U.S. Navy nuclear-powered vessel was what type of ship?

1. Carrier
2. Submarine
3. Destroyer
4. Cruiser

Indicate in this way on your answer sheet:

	1	2	3	4	
	T	F			
s-1	☐	■	☐	☐	___

TRUE-FALSE QUESTIONS

Mark each statement true or false as indicated below. If any part of the statement is false, the entire statement is false. Make your decision, and blacken the appropriate box on the answer sheet.

SAMPLE

s-2. Shock will never be serious enough to cause death.

1. True
2. False

Indicate in this way on your answer sheet:

	1	2	3	4	
	T	F			
s-2	☐	■	☐	☐	___

MATCHING QUESTIONS

Each set of questions consists of two columns, each listing words, phrases or sentences. Your task is to select the item in column B which is the best match for the item in column A. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on your answer sheet.

SAMPLE

In answering questions s-3 through s-6, SELECT from column B the department where the shipboard officer in column A functions. Responses may be used once, more than once, or not at all.

A. OFFICER	B. DEPARTMENT
s-3. Damage Control Assistant	1. Operations Department
s-4. CIC Officer	2. Engineering Department
s-5. Disbursing Officer	3. Supply Department
s-6. Communications Officer	4. Navigation Department

Indicate in this way on your answer sheet:

	1	2	3	4	
	T	F			
s-3	☐	■	☐	☐	___
s-4	■	☐	☐	☐	___
s-5	☐	☐	■	☐	___
s-6	■	☐	☐	☐	___

ASSIGNMENT 1

Textbook Assignment: "Fundamentals and Operations of Computers," chapter 1, pages 1-1 through 1-17; "Computer Configurations and Hardware," chapter 2, pages 2-1 through 2-12.

1-1. All computers have which of the following components in common?

1. Modem, memory, and floppy drives
2. Math coprocessor, microchips, and central processing unit
3. Central processing unit, memory, and input/output section
4. Analog processing unit, input/ output section, and microchips

1-2. The amount of computing power a computer has is determined by which of the following factors?

1. Physical size
2. Size of drives
3. Number of drives
4. Technology used

1-3. All computers must be capable of which of the following functions?

1. Processing and storing data
2. Retaining data on compact disks
3. Interfacing with mainframe computers
4. Interfacing with desktop publishing equipment

1-4. Computers can gather data by which of the following methods?

1. Manually only
2. Automatically only
3. Both manually and automatically
4. Local-area networks

1-5. A computer automatically gathers data by which of the following means?

1. From another system, subsystem, or equipment
2. From specific software
3. By a local terminal user
4. By a remote terminal user

1-6. Which of the following tasks is the main purpose of a computer?

1. Storing data
2. Gathering data
3. Processing data
4. Disseminating data

1-7. Computers can externally store data on which of the following types of media?

1. Magnetic disks only
2. Magnetic tape only
3. Paper tape only
4. Magnetic disks, magnetic tape, and paper tape

1-8. Computers can disseminate data to which of the following types of equipment?

1. A display subsystem only
2. A magnetic tape or disk unit only
3. A printer only
4. A display subsystem, magnetic tape or disk unit, and a printer

1-9. Computer systems display which of the following general types of data/information?

1 Hardware performance information only
2 Data related to the system's mission only
3 Status information related to the system's operation only
4. Data related to the system's mission and status information related to the system's operation, and hardware performance information

1-10. In addition to display units, a computer relies on what other equipment to display processed data?

1. Floppy disks
2. Processors
3. Printers
4. Modems

1-11. What are the three general types of computers?

1 Mini, macro, and laptop
2 Personal, mini, and macro
3 Mainframe, mini, and micro
4 Technological, mainframe, and desktop

1-12. The mainframe computers you will maintain in the Navy are categorized by which of the following terms?

1. Word processing
2. General purpose
3. Specialized
4. Graphical

1-13. The Navy adapts a specific program to fit its needs and does not deviate once this program is installed into the computer.

1. True
2. False

1-14. What type of computer is housed in a large, rugged frame or cabinet?

1. Minicomputer
2. Microcomputer
3. Microcomputer
4. Mainframe computer

1-15. What types of computers use operator console and maintenance console panel/display control units to perform maintenance?

1. Mainframe computers
2. Microcomputers and minicomputers
3. Minicomputers and microcomputers
4. Microcomputers and local-area network computers

1-16. Although a computer maybe used for many types of operations, which of the following computers are considered the heart of the tactical and tactical support data systems?

1. Minicomputers
2. Microcomputers
3. Mainframe computers
4. Minicomputers or microcomputers, depending on the system

1-17. The SNAP I and II systems use as their host computers which of the following equipment?

1. Minicomputers
2. Microcomputers
3. Mainframe computers
4. Local-area network computers

1-18. Some of the newer microcomputers maybe even more powerful than older, larger mainframe computers.

1. True
2. False

1-19. What type of computer has the CPU contained on a single integrated chip?

1. Microcomputer
2. Macrocomputer
3. Minicomputer
4. Mainframe computer

1-20. Which of the following elements is generally considered an optional equipment for microcomputers?

1. Display monitor
2. Keyboard
3. Printer
4. Modem

1-21. Training for which of the following types of computers is NOT NEC producing?

1. Minicomputer
2. Microcomputer
3. Mainframe computer
4. Macrocomputer

1-22. What is the heart of every data system?

1. Software
2. Operator
3. Computer
4. Peripherals

1-23. How do computer systems exchange data?

1. Through local-area networks
2. Through transfer of software
3. Through a knowledgeable and competent operator
4. Through a series of interrupts, requests, and acknowledges

1-24. Which of the following types of data do computers exchange?

1. Data words only
2. Status signals only
3. Control signals only
4. Data words, status signals, and control signals

1-25. How is interfacing between computers and peripherals accomplished?

1. Cables and connectors
2. Electronic emissions
3. Output devices
4. External disk drives

1-26. What are the three operational uses of computers by the Navy?

1. Graphical, database, and tactical
2. Nontactical, tactical, and tactical support
3. Tactical support, graphical, and database
4. Word processing, tactical support, and nontactical

1-27. The number of computers used in a tactical data system depends on which of the following factors?

1. Size of ship
2. Class of ship
3. Mission of ship
4. Length of ship deployment

1-28. Tactical support platforms include a variety of systems and normally use which of the following types of computers in their operations?

1. Minicomputers only
2. Microcomputers only
3. Mainframe computers only
4. Microcomputers and mainframe computers

1-29. ASW systems use what means as the central point of operation?

1. A single computer only
2. A data processing subsystem
3. A video processing subsystem
4. Multiple computers

1-30. In a JMCIS system, informational data is provided to designated flagships for what purpose?

1. Logistical inventories
2. Flight orders of shipboard planes
3. Mobilization and documentation of personnel
4. Battle management of tactical situations

1-31. In the JMCIS system, how do desktop computers in the data processing and video processing subsystems communicate?

1. By coaxial cable
2. By fiber-optic LANs
3. By disk exchange
4. By modems

1-32. The naval intelligence processing system uses which of the following types of specially modified computers in a LAN configuration as its operational computers?

1. Unisys 44
2. Unisys 101
3. Zenith 150
4. DTC/TAC-n personal computers

1-33. The naval intelligence processing system uses which of the following operating systems?

1. OS-2 and UNIX
2. OS-2 and MS-DOS
3. MS-DOS@ and UNIX™
4. DR-DOS and INIX

NOTE: MS-DOS is a registered trademark of Microsoft Corporation. UNIX is a trademark of AT&T.

1-34. Nontactical systems normally use which of the following types of computers?

1. Minicomputers and microcomputers
2. Mainframes and minicomputers
3. Microcomputers and mainframes
4. Desktop and mainframes

1-35. What are BASIC, FORTRAN, COBOL, PASCAL, and C?

1. Computer programs
2. Computer languages
3. Computer processing units
4. Computer operating systems

1-36. On a LAN, personal computers can share which of the following resources?

1. Software only
2. Data files only
3. Data files and peripherals only
4. Data files, peripherals, and software

1-37. The type and number of computers that make up a system have a direct bearing on which of the following elements?

1. Hardware and software
2. Configuration and setup
3. Operating system and location
4. Number of operators and types of software

1-38. Hardware setup includes what three things?

1. Physical design, ease of maintenance, and operator controls
2. Operator controls, external controls, and physical design
3. External controls, ease of maintenance, and physical design
4. Maintenance availability, operator controls, and external controls

1-39. In software setup, what must you specify to the software?

1. The resources to use
2. The number of operators
3. The climate of the location
4. The purpose of the software

1-40. Your involvement with software is directly dependent on which of the following factors?

1. Type of mission
2. Type of computer
3. Type of peripherals
4. Type of organization

1-41. Who designs the software for mainframes used in tactical and tactical support applications?

1. Outside support activities
2. Commercial software designers
3. Shipboard computer programmers
4. MOTUS

1-42. When configuring and setting up software for a microcomputer, you must keep in mind which of the following factors?

1. You must know how to correct operational program discrepancies
2. You must use only software that was designed by an outside support activity
3. The computer system must be connected to the nearest mainframe computer
4. The operating system must be customized to the hardware of the computer system

1-43. When using applications software with your microcomputer, you must ensure that the software is compatible with which of the following elements?

1. Coprocessor
2. Operating system
3. Memory unit
4. Mainframe computers

1-44. When the computer is online, which of the following factors cause it to function correctly?

1. Software
2. Peripherals
3. RAM capacity
4. Modems

1-45. In the offline mode of operation, a computer is limited to performing which of the following operations?

1. Tactical
2. Nontactical
3. Maintenance
4. Tactical support

1-46. The battle short mode of operation is used when the computer must run continuously under which of the following conditions?

1. When loading software
2. When performing maintenance
3. When an overtemperature condition exists
4. When an under-temperature condition exists

1-47. An overtemperature condition can be a result of which of the following conditions?

1. Too many software programs loaded into ROM
2. A failed assembly situation only
3. An inadequate cooling condition only
4. Either a failed assembly situation or an inadequate cooling situation

1-48. The operational capabilities and limitations of a computer system can be controlled by all except which of the following devices?

2. Telephone hookups
3. Software commands
4. Control panels

1-49. To reconfigure a computer system to a reduced capability, which of the following devices can be used?

1. Peripherals only
2. Switchboards only
3. Control panels only
4. Switchboards, control panels, and I/O devices

1-50. A computer's effective operation and security may be seriously jeopardized by which of the following factors?

1. Electromagnetic interference and lack of ADP security
2. Electromagnetic interference and physical location of equipment
3. Operator knowledge of mission and lack of ADP security
4. Both 2 and 3 above

1-51. The Navy ensures that only authorized users gain access to computer nontactical systems (SNAP) by which of the following means?

1. Locking the computer when it is not in authorized use
2. Authorizing the use of only certain software
3. Storing the software in a secure place
4. Using passwords to identify authorized users

1-52. To learn more about computer security, which of the following instructions should you study?

1. OPNAVINST 5239.1 only
2. OPNAVINST 5510.1 only
3. Both OPNAVINSTS 5239.1 and 5510.1
4. MIL-STD-1355

1-53. What type of electromagnetic interference (EMI) causes the majority of EMI problems in digital data equipment?

1. Narrowband
2. Broadband
3. Inherent
4. Natural

1-54. Aboard ship, which of the following conditions does NOT have a significant effect in EMI?

1. Grounding of equipment
2. Interconnecting cables
3. Location of equipment
4. Software in use

1-55. At a shore-based installation, control of EMI involves the same factors as a shipboard computer system, but with the addition of which of the following other considerations?

1. Terminal operators
2. Site location only
3. Soil quality only
4. Both site location and soil quality

1-56. To assist in avoiding or reducing the effects of EMI, you may find guidelines for the proper construction of bonding straps and grounding cables in which of the following publications?

1. OPNAVINST 5510.1
2. NAVSEA OP 3556
3. NAVSEA S9507
4. MIL-STD 1310

1-57. The fictional units of a computer are always consistent regardless of the computer's type.

1. True
2. False

1-58. To obtain the most reliable and effective instructions for maintaining a computer, you should refer to which of the following current references?

1. OPNAVINST 5239.1
2. SECNAVINST 5230.7
3. The computer's technical manual
4. Local instructions

1-59. A computer's fictional block diagram should provide you with all of the following information except which one?

1. Operational principles
2. Software compatibility
3. Signal types and flows
4. Major functional areas.

1-60. What are the three major functional areas of a computer?

1. CPU, I/O, and modem
2. Memory, I/O, and CPU
3. Hard disk, modem, and memory
4. Monitor, memory, and hard disk

1-61. The physical layout diagram gives you a picture of all of the following locations or types of computer elements except which one?

1. Module
2. Console
3. Assembly
4. Signal flow

1-62. What are the four types of physical layouts for computers?

1. Backplane, assembly, cage, and LAN
2. Cage, motherboard, modular, and desktop
3. Assembly, rack, backplane, and modular
4. Chassis, motherboard, mainframe, and desktop

1-63. For modular data systems that use multiple configurations, both minimum and fill physical layout configurations will be shown on a physical layout.

1. True
2. False

1-64. In a chassis or assembly type computer, which of the following methods is/are usually used to mount the chassis or assembly?

1. Door mounted only
2. Slide mounted only
3. Both door and slide mounted
4. Backplane mounted

1-65. A cage or rack type computer's major functional areas are always contained on one pcb.

1. True
2. False

1-66. Computers that use motherboards usually have a total of how many backplanes or motherboards to contain assemblies and pcb's?

1. One
2. Two
3. Three
4. Four

1-67. What layout gives you information on subassemblies or printed circuit boards in each assembly, chassis, or module?

1. Overall physical layout
2. Overall fictional layout
3. Individual physical layout
4. Individual fictional layout

1-68. You do not have a need for an individual physical layout diagram in which of the following situations?

1. When you have the overall physical layout diagram
2. When you have the overall functional layout diagram
3. When you have the repair memorized
4. When you never repair the unit

1-69. The configuration of a particular computer is normally dictated by which of the following criteria?

1. Type of computer and data system platform
2. Available power supply and programming needs
3. Data system platform and projected use of computer
4. Type of computer and anticipated software installation

1-70. A computer's frame usually contains which of the following hardware?

1. The computer only
2. The power supply only
3. The computer and the power supply only
4. The computer, power supply, and cooling hardware

1-71. When compared to other types of computer cabinets, what is the largest single advantage of modular frames in addition to mobility?

1. Ruggedness
2. Adaptability
3. Ease of installation
4. Access to control panels

1-72. Pcb's are arranged in which of the following ways inside a chassis?

1. In close proximity and in square blocks
2. In close proximity and in rows
3. Spread out and in rows
4. Spread out and on opposite sides of the cabinet

1-73. Motherboard-designed computers have which of the following features as their primary design feature?

1. Portability
2. Ruggedness
3. Shipboard use
4. Tactical use

1-74. It is easier to maintain computers that have motherboards for which of the follow reasons?

1. The cabinet need not be removed
2. The power need not be secured
3. The computer's small size and ease of component accessibility
4. All of the above

1-75. What two features used in or on a cabinet provide limited protection for a computer?

1. Gaskets and filters
2. Surge protectors and shock reducers
3. Insulating material and grounding wires
4. External power source and RF interference adapters